

In the claims:

Please cancel claim 12, and rewrite the claims as follows:

- - 1. (Original) A combined vertical and release micromachining process, comprising the steps of:

forming a mask on a substrate;

substantially isotropically etching said substrate through said mask and slightly undercutting said mask;

conformally passivating said substrate to produce a passivation layer of selected thickness;

alternately etching and passivating said substrate to define a structure in said substrate;

controlling the timing of said etching and passivating steps to produce a structure having substantially vertical walls; and

thereafter altering the timing of said etching and passivating steps to deposit a passivation layer of increased thickness and to etch said substrate to completely undercut and to release said structure.

2.(Original) The process of claim 1, wherein said steps are repeated to produce a second released structure self-aligned below said first structure in said substrate.

3.(Original) The process of claim 1, wherein said steps form a first level structure, and further including the steps of:

vertically etching said substrate through said mask and through said first level structure to form a trench defining a second level structure;

applying an oxide layer to the sidewalls of said trench; and
anisotropically etching said trench below said sidewall oxide layer to release said second level structure.

4.(Original) The process of claim 3, wherein forming a mask includes defining said first level structure to have a first width, and wherein vertically etching said substrate through said first level structure defines said second level structure to have a second width greater than said first width by the thickness of said first level passivation layer.

5.(Original) The process of claim 4, further including electrically isolating selected segments of said first and second structures by thermal oxidation of said structures.

6.(Original) The process of claim 5, further forming an electrical contact point on said structures.

7.(Original) The process of claim 6, further including applying an electrically conductive layer to said structures.

8.(Original) The process of claim 4, further including removing selected portions of said structures by a focused ion beam.

9.(Original) The process of claim 4, further including removing a selected portion of said structures by fully oxidizing a selected thin segment of said structure and etching away said thin segment.

10.(Original) The process of claim 4, further including depositing a second mask on said structures, and thermally oxidizing a selected portion of said structure through said mask.

11.(Original) The process of claim 1, wherein said substrate is alternately etched and passivated to produce a high aspect ratio structure.

12. (Cancelled)

13. (New) The process of claim 1, wherein said step of altering the timing of said etching and passivating includes isotropically etching said substrate, whereby the process combines anisotropic and isotropic etches to vertically etch and then isotropically undercut and release structures from a substrate.

14. (New) The process of claim 13, wherein said vertical etch and subsequent release of structures from the substrate is accomplished without requiring separate sidewall passivation layer deposition and etchback steps.

15. (New) A micromachining process comprising the steps of:

forming a mask on a substrate;

isotropically etching said substrate through said mask;

conformally passivating said substrate to produce a passivation layer of selected thickness;

alternately further etching and further passivating said substrate with controlled timing to define in said substrate a structure having a selected width and having substantially vertical walls: and

thereafter altering the timing of said etching and passivating steps to deposit a passivation layer of increased thickness and to etch said substrate laterally under said vertical walls to completely undercut and to release said structure.

16. (New) The process of claim 15, wherein said substrate is alternately etched and passivated to produce a structure having a high height to width ratio.
17. (New) The process of claim 15, wherein said structure has an arbitrary geometry determined by said mask and by said etching steps.
18. (New) The process of claim 15, wherein said etching and passivation steps are low-temperature process steps, and wherein said process uses a single masking step.
19. (New) The process of claim 15, wherein said substrate incorporates a prefabricated active electronic device which can be electrically connected to the released structure.
20. (New) The process of claim 15, wherein said substrate incorporates a previously fabricated active device placed such to be part of the released structure for sensing.
21. (New) The process of claim 15, further including electrically isolating at least one segment of said structure by thermal oxidation.
22. (New) The process of claim 15, further including electrically isolating selected segments of said structure by the insertion of trenches of insulating material in the substrate prior to the fabrication of the released structure.

23. (New) The process of claim 15, further including forming an electrical contact point on said structure.

24. (New) The process of claim 23, further including applying an electrically conductive layer on the surface of said structure.

25. (New) The process of claim 15, further including repeating said etching and passivation steps to produce a second released structure self-aligned below said first structure in said substrate.

26. (New) The process of claim 15, wherein said steps form a first level structure, and further including the steps of:

vertically etching said substrate through said mask and through said first level structure to form a trench defining a second level structure;

applying an oxide layer to the sidewalls of said trench; and

anisotropically etching said trench below said sidewall oxide layer to release said second level structure.

27. (New) The process of claim 26, further including repeating said steps to produce additional self-aligned levels of released structures.

28. (New) The process of claim 26, wherein forming a mask includes defining said first level structure to have a first width, and wherein vertically etching said substrate through said first

level structure defines said second level structure to have a second width greater than said first width by the thickness of said first level passivation layer.

29. (New) The process of claim 15, further including an additional vertical etch defining an unreleased structure below and self-aligned to the first, released structure.

30. (New) The process of claim 29, where the first-level vertical etch, first-level release and second-level vertical etch are carried out in a single sequence.

31. (New) The process of claim 26, further including electrically isolating selected segments of said first and second structures by thermal oxidation of said structures.

32. (New) The process of claim 31, further including forming an electrical contact point on said structures.

33. (New) The process of claim 32, further including applying an electrically conductive layer to said structures.

34. (New) The process of claim 26, further including removing selected portions of said structures by a focused ion beam.

35. (New) The process of claim 26, further including removing a selected portion of said structure by fully oxidizing a selected thin segment of said structure and etching away said thin segment.

36. (New) The process of claim 26, further including depositing a second mask on said structure, and thermally oxidizing a selected portion of said structure through said mask.